SEQUENCE LISTING

<110> Meyers, Rachel
      Cook, William James
      Williamson, Mark
      Rudolph-Owen, Laura A.
      Gimeno, Ruth

<120> 32142, 21481, 25964, 21686, NOVEL DEHYDROGENASE
      MOLECULES AND USES THEREFOR

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<151> 2001-03-23

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<151> 2000-08-08

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   Met Ala Ala Thr Arg Ala Gly Pro Arg Ala Arg Glu Ile Phe Thr
   1   5   10   15

tcg ctg gag tac gga ccg gtg ccg gag agc cac gca tgc gca ctg gcc   155
Ser Leu Glu Tyr Gly Pro Val Pro Glu Ser His Ala Cys Ala Leu Ala
                20   25   30

tgg ctg gac acc cag gac cgg tgc ttg ggc cac tat gtg aat ggg aag   203
Trp Leu Asp Thr Gln Asp Arg Cys Leu Gly His Tyr Val Asn Gly Lys
            35   40   45

tgg tta aag cct gaa cac aga aat tca gtg cct tgc cag gat ccc atc   251
Trp Leu Lys Pro Glu His Arg Asn Ser Val Pro Cys Gln Asp Pro Ile
        50   55   60

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aca gga gag aac ttg gcc agt tgc ctg cag gca cag gcc gag gat gtg    299
Thr Gly Glu Asn Leu Ala Ser Cys Leu Gln Ala Gln Ala Glu Asp Val
        65              70              75

gct gca gcc gtg gag gca gcc agg atg gca ttt aag ggc tgg agt gcg    347
Ala Ala Ala Val Glu Ala Ala Arg Met Ala Phe Lys Gly Trp Ser Ala
 80              85              90              95

cac ccc ggc gtc gtc cgg gcc cag cac ctg acc agg ctg gcc gag gtg    395
His Pro Gly Val Val Arg Ala Gln His Leu Thr Arg Leu Ala Glu Val
                100             105              110

atc cag aag cac cag cgg ctg ctg tgg acc ctg gaa tcc ctg gtg act    443
Ile Gln Lys His Gln Arg Leu Leu Trp Thr Leu Glu Ser Leu Val Thr
            115             120             125

ggg cgg gct gtt cga gag gtt cga gac ggg gac gtc cag ctg gcc cag    491
Gly Arg Ala Val Arg Glu Val Arg Asp Gly Asp Val Gln Leu Ala Gln
        130             135             140

cag ctg ctc cac tac cat gca atc cag gca tcc acc cag gag gag gca    539
Gln Leu Leu His Tyr His Ala Ile Gln Ala Ser Thr Gln Glu Glu Ala
        145             150             155

ctg gca ggc tgg gag ccc atg gga gta att ggc ctc atc ctg cca ccc    587
Leu Ala Gly Trp Glu Pro Met Gly Val Ile Gly Leu Ile Leu Pro Pro
160             165             170             175

aca ttc tcc ttc ctt gag atg atg tgg agg att tgc cct gcc ctg gct    635
Thr Phe Ser Phe Leu Glu Met Met Trp Arg Ile Cys Pro Ala Leu Ala
                180             185             190

gtg ggc tgc acc gtg gtg gcc ctc gtg ccc ccg gcc tcc ccg gcg ccc    683
Val Gly Cys Thr Val Val Ala Leu Val Pro Pro Ala Ser Pro Ala Pro
            195             200             205

ctc ctc ctg gcc cag ctg gcg ggg gag ctg ggc ccc ttc ccg gga atc    731
Leu Leu Leu Ala Gln Leu Ala Gly Glu Leu Gly Pro Phe Pro Gly Ile
            210             215             220

ctg aat gtc gtc agt ggc cct gcg tcc ctg gtg ccc atc ctg gcc tcc    779
Leu Asn Val Val Ser Gly Pro Ala Ser Leu Val Pro Ile Leu Ala Ser
        225             230             235

cag cct gga atc cgg aag gtg gcc ttc tgc gga gcc ccg gag gaa ggg    827
Gln Pro Gly Ile Arg Lys Val Ala Phe Cys Gly Ala Pro Glu Glu Gly
240             245             250             255

cgt gcc ctt cga cgg agc ctg gcg gga gag tgt gcg gag ctg ggc ctg    875
Arg Ala Leu Arg Arg Ser Leu Ala Gly Glu Cys Ala Glu Leu Gly Leu
            260             265             270

gcg ctg ggg acg gag tcg ctg ctg ctg ctg acg gac acg gcg gac gta    923
Ala Leu Gly Thr Glu Ser Leu Leu Leu Leu Thr Asp Thr Ala Asp Val
            275             280             285

gac tcg gcc gtg gag ggt gtc gtg gac gcc gcc tgg tcc gac cgc ggc    971
Asp Ser Ala Val Glu Gly Val Val Asp Ala Ala Trp Ser Asp Arg Gly
        290             295             300
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ccg ggt ggc ctc agg ctc ctc atc cag gag tct gtg tgg gat gaa gcc    1019
Pro Gly Gly Leu Arg Leu Leu Ile Gln Glu Ser Val Trp Asp Glu Ala
305                 310                 315

atg aga cgg ctg cag gag cgg atg ggg cgg ctt cgg agt ggc cga ggg    1067
Met Arg Arg Leu Gln Glu Arg Met Gly Arg Leu Arg Ser Gly Arg Gly
320                 325                 330                 335

ctg gat ggg gcc gtg gac atg ggg gcc cgg ggg gct gcc gca tgt gac    1115
Leu Asp Gly Ala Val Asp Met Gly Ala Arg Gly Ala Ala Ala Cys Asp
                340                 345                 350

ctg gtc cag cgc ttt gtg cgt gag gcc cag agc cag ggt gca cag gtg    1163
Leu Val Gln Arg Phe Val Arg Glu Ala Gln Ser Gln Gly Ala Gln Val
                355                 360                 365

ttc cag gct ggt gat gtg cct tcg gaa cgc cca ttc tat ccc cca acc    1211
Phe Gln Ala Gly Asp Val Pro Ser Glu Arg Pro Phe Tyr Pro Pro Thr
                370                 375                 380

ttg gtc tcc aac ctg ccc cca gcc tcc cca tgt gcc cag gtg gag gtg    1259
Leu Val Ser Asn Leu Pro Pro Ala Ser Pro Cys Ala Gln Val Glu Val
                385                 390                 395

ccg tgg cct gtg gtc gtg gcc tcc ccc ttc cgc aca gcc aag gag gca    1307
Pro Trp Pro Val Val Val Ala Ser Pro Phe Arg Thr Ala Lys Glu Ala
400                 405                 410                 415

ctg ttg gtg gcc aac ggg acg ccc cgc ggg ggc agc gcc agt gtg tgg    1355
Leu Leu Val Ala Asn Gly Thr Pro Arg Gly Gly Ser Ala Ser Val Trp
                420                 425                 430

agc gag agg ctg ggg cag gcg ctg gag ctg ggc tat ggg ctc cag gtg    1403
Ser Glu Arg Leu Gly Gln Ala Leu Glu Leu Gly Tyr Gly Leu Gln Val
                435                 440                 445

ggc act gtc tgg atc aac gcc cac ggc ctc aga gac cct tcg gtg ccc    1451
Gly Thr Val Trp Ile Asn Ala His Gly Leu Arg Asp Pro Ser Val Pro
                450                 455                 460

aca ggc ggc tgc aag gag agt ggg tgt tcc tgg cac ggg ggc cca gac    1499
Thr Gly Gly Cys Lys Glu Ser Gly Cys Ser Trp His Gly Gly Pro Asp
465                 470                 475

ggg ctg tat gag tat ctg cgg ccc tca ggg acc cct gcc cgg ctg tcc    1547
Gly Leu Tyr Glu Tyr Leu Arg Pro Ser Gly Thr Pro Ala Arg Leu Ser
480                 485                 490                 495

tgc ctc tcc aag aac ctg aac tat gac acc ttt ggc ctc gct gtg ccc    1595
Cys Leu Ser Lys Asn Leu Asn Tyr Asp Thr Phe Gly Leu Ala Val Pro
                500                 505                 510

tca acc ctg ccg gct ggg cct gaa ata ggg ccc agc cca gca ccc ccc    1643
Ser Thr Leu Pro Ala Gly Pro Glu Ile Gly Pro Ser Pro Ala Pro Pro
                515                 520                 525

tat ggg ctc ttc gtt ggg ggc cgt ttc cag gct cct ggg gcc cga agc    1691
Tyr Gly Leu Phe Val Gly Gly Arg Phe Gln Ala Pro Gly Ala Arg Ser
                530                 535                 540
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tcc agg ccc atc cgg gat tcg tct ggc aat ctc cat ggc tac gtg gct   1739
Ser Arg Pro Ile Arg Asp Ser Ser Gly Asn Leu His Gly Tyr Val Ala
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gag ggt gga gcc aag gac atc cga ggt gct gtg gag gcc gct cac cag   1787
Glu Gly Gly Ala Lys Asp Ile Arg Gly Ala Val Glu Ala Ala His Gln
560             565             570             575

gct ttc cct ggc tgg gcg ggc cag tcc cca gga gcc cgg gca gcc ctg   1835
Ala Phe Pro Gly Trp Ala Gly Gln Ser Pro Gly Ala Arg Ala Ala Leu
                580             585             590

ctg tgg gcc ctg gcg gct gca ctg gag cgc cgg aag tct acc ctg gcc   1883
Leu Trp Ala Leu Ala Ala Ala Leu Glu Arg Arg Lys Ser Thr Leu Ala
                595             600             605

tca agg ctg gag agg cag gga gcg gag ctc aag gct gcg gag gcg gag   1931
Ser Arg Leu Glu Arg Gln Gly Ala Glu Leu Lys Ala Ala Glu Ala Glu
            610             615             620

gtg gag ctg agc gca aga cga ctt cgg gcg tgg ggg gcc cgg gtg cag   1979
Val Glu Leu Ser Ala Arg Arg Leu Arg Ala Trp Gly Ala Arg Val Gln
        625             630             635

gcc caa ggc cac acc ctg cag gta gcc ggg ctg aga ggc cct gtg ctg   2027
Ala Gln Gly His Thr Leu Gln Val Ala Gly Leu Arg Gly Pro Val Leu
640             645             650             655

cgc ctg cgg gag ccg ctg ggt gtg ctg gct gtg gtg tgt ccg gac gag   2075
Arg Leu Arg Glu Pro Leu Gly Val Leu Ala Val Val Cys Pro Asp Glu
                660             665             670

tgg ccc ctg ctt gcc ttc gtg tcc ctg ctg gct ccc gcc ctg gcc tac   2123
Trp Pro Leu Leu Ala Phe Val Ser Leu Leu Ala Pro Ala Leu Ala Tyr
                675             680             685

ggc aac act gtg gtc atg gtg ccc agt gcg gcc tgt cct ctg ctg gcc   2171
Gly Asn Thr Val Val Met Val Pro Ser Ala Ala Cys Pro Leu Leu Ala
            690             695             700

ctg gag gtc tgc cag gac atg gcc acc gtg ttc cca gca ggc ctg gcc   2219
Leu Glu Val Cys Gln Asp Met Ala Thr Val Phe Pro Ala Gly Leu Ala
        705             710             715

aac gtg gtg aca gga gac cgg gac cat ctg acc cgc tgc ctg gcc ttg   2267
Asn Val Val Thr Gly Asp Arg Asp His Leu Thr Arg Cys Leu Ala Leu
720             725             730             735

cac caa gac gtc cag gcc atg tgg tat ttc gga tca gcc cag ggt tcc   2315
His Gln Asp Val Gln Ala Met Trp Tyr Phe Gly Ser Ala Gln Gly Ser
            740             745             750

cag ttt gtc gag tgg gcc tcg gca gga aac ctc aaa ccg gtg tgg gcg   2363
Gln Phe Val Glu Trp Ala Ser Ala Gly Asn Leu Lys Pro Val Trp Ala
            755             760             765

agc agg ggc tgc ccg cgg gcc tgg gac cag gag gcc gag ggg gca ggc   2411
Ser Arg Gly Cys Pro Arg Ala Trp Asp Gln Glu Ala Glu Gly Ala Gly
            770             775             780
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cca gag ctg ggg ctg cga gtg gcg cgg acc aag gcc ctg tgg ctg cct   2459
Pro Glu Leu Gly Leu Arg Val Ala Arg Thr Lys Ala Leu Trp Leu Pro
        785                 790                 795
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atg ggg gac tgatgcctga gcgccaccta ctgcattttg gacacctcac            2508
Met Gly Asp
800
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accaaggggа gatgcacccc acagacacct gggactttcc ccttctggtt cctgtgtctc 2568
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ccaataaact ctctgaccaa ccctaaaaaa aaaaaaaaaa aaaaaaaaaa rwarmaactt 2628
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Leu Asp Thr Gln Asp Arg Cys Leu Gly His Tyr Val Asn Gly Lys Trp
         35                  40                  45

Leu Lys Pro Glu His Arg Asn Ser Val Pro Cys Gln Asp Pro Ile Thr
     50                  55                  60

Gly Glu Asn Leu Ala Ser Cys Leu Gln Ala Gln Ala Glu Asp Val Ala
 65                  70                  75                  80

Ala Ala Val Glu Ala Ala Arg Met Ala Phe Lys Gly Trp Ser Ala His
                85                  90                  95

Pro Gly Val Val Arg Ala Gln His Leu Thr Arg Leu Ala Glu Val Ile
            100                 105                 110

Gln Lys His Gln Arg Leu Leu Trp Thr Leu Glu Ser Leu Val Thr Gly
        115                 120                 125

Arg Ala Val Arg Glu Val Arg Asp Gly Asp Val Gln Leu Ala Gln Gln
    130                 135                 140

Leu Leu His Tyr His Ala Ile Gln Ala Ser Thr Gln Glu Glu Ala Leu
145                 150                 155                 160

Ala Gly Trp Glu Pro Met Gly Val Ile Gly Leu Ile Leu Pro Pro Thr
                165                 170                 175

Phe Ser Phe Leu Glu Met Met Trp Arg Ile Cys Pro Ala Leu Ala Val
            180                 185                 190

Gly Cys Thr Val Val Ala Leu Val Pro Pro Ala Ser Pro Ala Pro Leu
            195                 200                 205
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Leu Leu Ala Gln Leu Ala Gly Glu Leu Gly Pro Phe Pro Gly Ile Leu
210   215   220

Asn Val Val Ser Gly Pro Ala Ser Leu Val Pro Ile Leu Ala Ser Gln
225   230   235   240

Pro Gly Ile Arg Lys Val Ala Phe Cys Gly Ala Pro Glu Glu Gly Arg
                245   250   255

Ala Leu Arg Arg Ser Leu Ala Gly Glu Cys Ala Glu Leu Gly Leu Ala
            260   265   270

Leu Gly Thr Glu Ser Leu Leu Leu Leu Thr Asp Thr Ala Asp Val Asp
            275   280   285

Ser Ala Val Glu Gly Val Val Asp Ala Ala Trp Ser Asp Arg Gly Pro
        290   295   300

Gly Gly Leu Arg Leu Leu Ile Gln Glu Ser Val Trp Asp Glu Ala Met
305   310   315   320

Arg Arg Leu Gln Glu Arg Met Gly Arg Leu Arg Ser Gly Arg Gly Leu
            325   330   335

Asp Gly Ala Val Asp Met Gly Ala Arg Gly Ala Ala Ala Cys Asp Leu
            340   345   350

Val Gln Arg Phe Val Arg Glu Ala Gln Ser Gln Gly Ala Gln Val Phe
        355   360   365

Gln Ala Gly Asp Val Pro Ser Glu Arg Pro Phe Tyr Pro Pro Thr Leu
    370   375   380

Val Ser Asn Leu Pro Pro Ala Ser Pro Cys Ala Gln Val Glu Val Pro
385   390   395   400

Trp Pro Val Val Val Ala Ser Pro Phe Arg Thr Ala Lys Glu Ala Leu
            405   410   415

Leu Val Ala Asn Gly Thr Pro Arg Gly Gly Ser Ala Ser Val Trp Ser
        420   425   430

Glu Arg Leu Gly Gln Ala Leu Glu Leu Gly Tyr Gly Leu Gln Val Gly
    435   440   445

Thr Val Trp Ile Asn Ala His Gly Leu Arg Asp Pro Ser Val Pro Thr
    450   455   460

Gly Gly Cys Lys Glu Ser Gly Cys Ser Trp His Gly Gly Pro Asp Gly
465   470   475   480

Leu Tyr Glu Tyr Leu Arg Pro Ser Gly Thr Pro Ala Arg Leu Ser Cys
            485   490   495

Leu Ser Lys Asn Leu Asn Tyr Asp Thr Phe Gly Leu Ala Val Pro Ser
        500   505   510

Thr Leu Pro Ala Gly Pro Glu Ile Gly Pro Ser Pro Ala Pro Pro Tyr
    515   520   525

Gly Leu Phe Val Gly Gly Arg Phe Gln Ala Pro Gly Ala Arg Ser Ser
530   535   540

Arg Pro Ile Arg Asp Ser Ser Gly Asn Leu His Gly Tyr Val Ala Glu
545   550   555   560

Gly Gly Ala Lys Asp Ile Arg Gly Ala Val Glu Ala Ala His Gln Ala
565   570   575

Phe Pro Gly Trp Ala Gly Gln Ser Pro Gly Ala Arg Ala Ala Leu Leu
580   585   590

Trp Ala Leu Ala Ala Ala Leu Glu Arg Arg Lys Ser Thr Leu Ala Ser
595   600   605

Arg Leu Glu Arg Gln Gly Ala Glu Leu Lys Ala Ala Glu Ala Glu Val
610   615   620

Glu Leu Ser Ala Arg Arg Leu Arg Ala Trp Gly Ala Arg Val Gln Ala
625   630   635   640

Gln Gly His Thr Leu Gln Val Ala Gly Leu Arg Gly Pro Val Leu Arg
645   650   655

Leu Arg Glu Pro Leu Gly Val Leu Ala Val Val Cys Pro Asp Glu Trp
660   665   670

Pro Leu Leu Ala Phe Val Ser Leu Leu Ala Pro Ala Leu Ala Tyr Gly
675   680   685

Asn Thr Val Val Met Val Pro Ser Ala Ala Cys Pro Leu Leu Ala Leu
690   695   700

Glu Val Cys Gln Asp Met Ala Thr Val Phe Pro Ala Gly Leu Ala Asn
705   710   715   720

Val Val Thr Gly Asp Arg Asp His Leu Thr Arg Cys Leu Ala Leu His
725   730   735

Gln Asp Val Gln Ala Met Trp Tyr Phe Gly Ser Ala Gln Gly Ser Gln
740   745   750

Phe Val Glu Trp Ala Ser Ala Gly Asn Leu Lys Pro Val Trp Ala Ser
755   760   765

Arg Gly Cys Pro Arg Ala Trp Asp Gln Glu Ala Glu Gly Ala Gly Pro
770   775   780

Glu Leu Gly Leu Arg Val Ala Arg Thr Lys Ala Leu Trp Leu Pro Met
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ctg gag tac gga ccg gtg ccg gag agc cac gca tgc gca ctg gcc tgg    96
Leu Glu Tyr Gly Pro Val Pro Glu Ser His Ala Cys Ala Leu Ala Trp
                20                  25                  30

ctg gac acc cag gac cgg tgc ttg ggc cac tat gtg aat ggg aag tgg   144
Leu Asp Thr Gln Asp Arg Cys Leu Gly His Tyr Val Asn Gly Lys Trp
            35                  40                  45

tta aag cct gaa cac aga aat tca gtg cct tgc cag gat ccc atc aca   192
Leu Lys Pro Glu His Arg Asn Ser Val Pro Cys Gln Asp Pro Ile Thr
        50                  55                  60

gga gag aac ttg gcc agt tgc ctg cag gca cag gcc gag gat gtg gct   240
Gly Glu Asn Leu Ala Ser Cys Leu Gln Ala Gln Ala Glu Asp Val Ala
65                  70                  75                  80

gca gcc gtg gag gca gcc agg atg gca ttt aag ggc tgg agt gcg cac   288
Ala Ala Val Glu Ala Ala Arg Met Ala Phe Lys Gly Trp Ser Ala His
                85                  90                  95

ccc ggc gtc gtc cgg gcc cag cac ctg acc agg ctg gcc gag gtg atc   336
Pro Gly Val Val Arg Ala Gln His Leu Thr Arg Leu Ala Glu Val Ile
                100                 105                 110

cag aag cac cag cgg ctg ctg tgg acc ctg gaa tcc ctg gtg act ggg   384
Gln Lys His Gln Arg Leu Leu Trp Thr Leu Glu Ser Leu Val Thr Gly
            115                 120                 125

cgg gct gtt cga gag gtt cga gac ggg gac gtc cag ctg gcc cag cag   432
Arg Ala Val Arg Glu Val Arg Asp Gly Asp Val Gln Leu Ala Gln Gln
        130                 135                 140

ctg ctc cac tac cat gca atc cag gca tcc acc cag gag gag gca ctg   480
Leu Leu His Tyr His Ala Ile Gln Ala Ser Thr Gln Glu Glu Ala Leu
145                 150                 155                 160

gca ggc tgg gag ccc atg gga gta att ggc ctc atc ctg cca ccc aca   528
Ala Gly Trp Glu Pro Met Gly Val Ile Gly Leu Ile Leu Pro Pro Thr
                165                 170                 175

ttc tcc ttc ctt gag atg atg tgg agg att tgc cct gcc ctg gct gtg   576
Phe Ser Phe Leu Glu Met Met Trp Arg Ile Cys Pro Ala Leu Ala Val
                180                 185                 190

ggc tgc acc gtg gtg gcc ctc gtg ccc ccg gcc tcc ccg gcg ccc ctc   624
Gly Cys Thr Val Val Ala Leu Val Pro Pro Ala Ser Pro Ala Pro Leu
                195                 200                 205

ctc ctg gcc cag ctg gcg ggg gag ctg ggc ccc ttc ccg gga atc ctg   672
Leu Leu Ala Gln Leu Ala Gly Glu Leu Gly Pro Phe Pro Gly Ile Leu
            210                 215                 220
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aat gtc gtc agt ggc cct gcg tcc ctg gtg ccc atc ctg gcc tcc cag     720
Asn Val Val Ser Gly Pro Ala Ser Leu Val Pro Ile Leu Ala Ser Gln
225             230             235             240

cct gga atc cgg aag gtg gcc ttc tgc gga gcc ccg gag gaa ggg cgt     768
Pro Gly Ile Arg Lys Val Ala Phe Cys Gly Ala Pro Glu Glu Gly Arg
                245             250             255

gcc ctt cga cgg agc ctg gcg gga gag tgt gcg gag ctg ggc ctg gcg     816
Ala Leu Arg Arg Ser Leu Ala Gly Glu Cys Ala Glu Leu Gly Leu Ala
            260             265             270

ctg ggg acg gag tcg ctg ctg ctg ctg acg gac acg gcg gac gta gac     864
Leu Gly Thr Glu Ser Leu Leu Leu Leu Thr Asp Thr Ala Asp Val Asp
            275             280             285

tcg gcc gtg gag ggt gtc gtg gac gcc gcc tgg tcc gac cgc ggc ccg     912
Ser Ala Val Glu Gly Val Val Asp Ala Ala Trp Ser Asp Arg Gly Pro
        290             295             300

ggt ggc ctc agg ctc ctc atc cag gag tct gtg tgg gat gaa gcc atg     960
Gly Gly Leu Arg Leu Leu Ile Gln Glu Ser Val Trp Asp Glu Ala Met
305                 310             315             320

aga cgg ctg cag gag cgg atg ggg cgg ctt cgg agt ggc cga ggg ctg    1008
Arg Arg Leu Gln Glu Arg Met Gly Arg Leu Arg Ser Gly Arg Gly Leu
                325             330             335

gat ggg gcc gtg gac atg ggg gcc cgg ggg gct gcc gca tgt gac ctg    1056
Asp Gly Ala Val Asp Met Gly Ala Arg Gly Ala Ala Ala Cys Asp Leu
            340             345             350

gtc cag cgc ttt gtg cgt gag gcc cag agc cag ggt gca cag gtg ttc    1104
Val Gln Arg Phe Val Arg Glu Ala Gln Ser Gln Gly Ala Gln Val Phe
            355             360             365

cag gct ggt gat gtg cct tcg gaa cgc cca ttc tat ccc cca acc ttg    1152
Gln Ala Gly Asp Val Pro Ser Glu Arg Pro Phe Tyr Pro Pro Thr Leu
370             375             380

gtc tcc aac ctg ccc cca gcc tcc cca tgt gcc cag gtg gag gtg ccg    1200
Val Ser Asn Leu Pro Pro Ala Ser Pro Cys Ala Gln Val Glu Val Pro
385             390             395             400

tgg cct gtg gtc gtg gcc tcc ccc ttc cgc aca gcc aag gag gca ctg    1248
Trp Pro Val Val Val Ala Ser Pro Phe Arg Thr Ala Lys Glu Ala Leu
                405             410             415

ttg gtg gcc aac ggg acg ccc cgc ggg ggc agc gcc agt gtg tgg agc    1296
Leu Val Ala Asn Gly Thr Pro Arg Gly Gly Ser Ala Ser Val Trp Ser
                420             425             430

gag agg ctg ggg cag gcg ctg gag ctg ggc tat ggg ctc cag gtg ggc    1344
Glu Arg Leu Gly Gln Ala Leu Glu Leu Gly Tyr Gly Leu Gln Val Gly
            435             440             445

act gtc tgg atc aac gcc cac ggc ctc aga gac cct tcg gtg ccc aca    1392
Thr Val Trp Ile Asn Ala His Gly Leu Arg Asp Pro Ser Val Pro Thr
450             455             460
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ggc ggc tgc aag gag agt ggg tgt tcc tgg cac ggg ggc cca gac ggg     1440
Gly Gly Cys Lys Glu Ser Gly Cys Ser Trp His Gly Gly Pro Asp Gly
465                 470                 475                 480

ctg tat gag tat ctg cgg ccc tca ggg acc cct gcc cgg ctg tcc tgc     1488
Leu Tyr Glu Tyr Leu Arg Pro Ser Gly Thr Pro Ala Arg Leu Ser Cys
                    485                 490                 495

ctc tcc aag aac ctg aac tat gac acc ttt ggc ctc gct gtg ccc tca     1536
Leu Ser Lys Asn Leu Asn Tyr Asp Thr Phe Gly Leu Ala Val Pro Ser
                500                 505                 510

acc ctg ccg gct ggg cct gaa ata ggg ccc agc cca gca ccc ccc tat     1584
Thr Leu Pro Ala Gly Pro Glu Ile Gly Pro Ser Pro Ala Pro Pro Tyr
            515                 520                 525

ggg ctc ttc gtt ggg ggc cgt ttc cag gct cct ggg gcc cga agc tcc     1632
Gly Leu Phe Val Gly Gly Arg Phe Gln Ala Pro Gly Ala Arg Ser Ser
        530                 535                 540

agg ccc atc cgg gat tcg tct ggc aat ctc cat ggc tac gtg gct gag     1680
Arg Pro Ile Arg Asp Ser Ser Gly Asn Leu His Gly Tyr Val Ala Glu
545                 550                 555                 560

ggt gga gcc aag gac atc cga ggt gct gtg gag gcc gct cac cag gct     1728
Gly Gly Ala Lys Asp Ile Arg Gly Ala Val Glu Ala Ala His Gln Ala
                565                 570                 575

ttc cct ggc tgg gcg ggc cag tcc cca gga gcc cgg gca gcc ctg ctg     1776
Phe Pro Gly Trp Ala Gly Gln Ser Pro Gly Ala Arg Ala Ala Leu Leu
                580                 585                 590

tgg gcc ctg gcg gct gca ctg gag cgc cgg aag tct acc ctg gcc tca     1824
Trp Ala Leu Ala Ala Ala Leu Glu Arg Arg Lys Ser Thr Leu Ala Ser
                595                 600                 605

agg ctg gag agg cag gga gcg gag ctc aag gct gcg gag gcg gag gtg     1872
Arg Leu Glu Arg Gln Gly Ala Glu Leu Lys Ala Ala Glu Ala Glu Val
                610                 615                 620

gag ctg agc gca aga cga ctt cgg gcg tgg ggg gcc cgg gtg cag gcc     1920
Glu Leu Ser Ala Arg Arg Leu Arg Ala Trp Gly Ala Arg Val Gln Ala
625                 630                 635                 640

caa ggc cac acc ctg cag gta gcc ggg ctg aga ggc cct gtg ctg cgc     1968
Gln Gly His Thr Leu Gln Val Ala Gly Leu Arg Gly Pro Val Leu Arg
                645                 650                 655

ctg cgg gag ccg ctg ggt gtg ctg gct gtg gtg tgt ccg gac gag tgg     2016
Leu Arg Glu Pro Leu Gly Val Leu Ala Val Val Cys Pro Asp Glu Trp
                660                 665                 670

ccc ctg ctt gcc ttc gtg tcc ctg ctg gct ccc gcc ctg gcc tac ggc     2064
Pro Leu Leu Ala Phe Val Ser Leu Leu Ala Pro Ala Leu Ala Tyr Gly
                675                 680                 685

aac act gtg gtc atg gtg ccc agt gcg gcc tgt cct ctg ctg gcc ctg     2112
Asn Thr Val Val Met Val Pro Ser Ala Ala Cys Pro Leu Leu Ala Leu
690                 695                 700
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gag gtc tgc cag gac atg gcc acc gtg ttc cca gca ggc ctg gcc aac    2160
Glu Val Cys Gln Asp Met Ala Thr Val Phe Pro Ala Gly Leu Ala Asn
705                 710             715                 720

gtg gtg aca gga gac cgg gac cat ctg acc cgc tgc ctg gcc ttg cac    2208
Val Val Thr Gly Asp Arg Asp His Leu Thr Arg Cys Leu Ala Leu His
                725             730             735

caa gac gtc cag gcc atg tgg tat ttc gga tca gcc cag ggt tcc cag    2256
Gln Asp Val Gln Ala Met Trp Tyr Phe Gly Ser Ala Gln Gly Ser Gln
                740             745             750

ttt gtc gag tgg gcc tcg gca gga aac ctc aaa ccg gtg tgg gcg agc    2304
Phe Val Glu Trp Ala Ser Ala Gly Asn Leu Lys Pro Val Trp Ala Ser
                755             760             765

agg ggc tgc ccg cgg gcc tgg gac cag gag gcc gag ggg gca ggc cca    2352
Arg Gly Cys Pro Arg Ala Trp Asp Gln Glu Ala Glu Gly Ala Gly Pro
        770             775             780

gag ctg ggg ctg cga gtg gcg cgg acc aag gcc ctg tgg ctg cct atg    2400
Glu Leu Gly Leu Arg Val Ala Arg Thr Lys Ala Leu Trp Leu Pro Met
785                 790             795                 800

ggg gac                                                            2406
Gly Asp
```

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<210> 4
<211> 1379
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (331)..(1263)

<220>
<221> misc_feature
<222> (1)..(1379)
<223> All occurrences of n = any nucleotide

<400> 4
tttggccctc gaggccaaga attcggcacg aggagcaagt ggccttaaca catggatttt 60

cttccaaaaa tgcagaccca ttttaattaa gtttgtaatt aaccactggg gagggcaggc 120

cccctggatt cggtctgctt tcggagacac tgtgagtaac ttcctatttg ttgaacattt 180

ggggattagc acgcccactg ggtgttcagc ttggaggctt gcacagagct gagctccctg 240

cagccttggg cctccccctg ccctgggagt cctgatcagc gtctctttgc aaagccaatc 300

ccctttact ccgttgtccc ccagaacaag atg gga gtc atg gcc atg ctg atg   354
                                 Met Gly Val Met Ala Met Leu Met
                                  1               5

ctc ccc ctg ctg ctg ctg gga atc agc ggc ctc ctc ttc att tac caa   402
Leu Pro Leu Leu Leu Leu Gly Ile Ser Gly Leu Leu Phe Ile Tyr Gln
     10                  15                  20
```

```
gag gtg tcc agg ctg tgg tca aag tca gct gtg cag aac aaa gtg gtg    450
Glu Val Ser Arg Leu Trp Ser Lys Ser Ala Val Gln Asn Lys Val Val
25              30                  35                  40

gtg atc acc gat gcc atc tca gga ctg ggc aag gag tgt gct cgg gtg    498
Val Ile Thr Asp Ala Ile Ser Gly Leu Gly Lys Glu Cys Ala Arg Val
            45                  50                  55

ttc cac aca ggt ggg gca agg ctg gtg ctg tgt gga aag aac tgg gag    546
Phe His Thr Gly Gly Ala Arg Leu Val Leu Cys Gly Lys Asn Trp Glu
            60                  65                  70

agg cta gag aac cta tat gat gcc ttg atc agc gtg gct gac ccc agc    594
Arg Leu Glu Asn Leu Tyr Asp Ala Leu Ile Ser Val Ala Asp Pro Ser
            75                  80                  85

aag aca ttc acc cca aag ctg gtc ctg ttg gac ctc tca gac atc agc    642
Lys Thr Phe Thr Pro Lys Leu Val Leu Leu Asp Leu Ser Asp Ile Ser
        90                  95                  100

tgt gtc cca gat gtg gca aaa gaa gtc ctg gat tgc tat ggc tgt gtg    690
Cys Val Pro Asp Val Ala Lys Glu Val Leu Asp Cys Tyr Gly Cys Val
105             110                 115                 120

gac atc ctc atc aac aat gcc agt gtg aag gtg aag ggg cct gcc cat    738
Asp Ile Leu Ile Asn Asn Ala Ser Val Lys Val Lys Gly Pro Ala His
                125                 130                 135

aag att tct ctg gag ctc gac aaa aag atc atg gat gcc aat tac ttt    786
Lys Ile Ser Leu Glu Leu Asp Lys Lys Ile Met Asp Ala Asn Tyr Phe
                140                 145                 150

ggc ccc atc aca ttg acg aaa gcc ctg ctt ccc aac atg atc tcc cgg    834
Gly Pro Ile Thr Leu Thr Lys Ala Leu Leu Pro Asn Met Ile Ser Arg
            155                 160                 165

aga aca ggc caa atc gtg tta gtg aat aat atc caa ggg aag ttt gga    882
Arg Thr Gly Gln Ile Val Leu Val Asn Asn Ile Gln Gly Lys Phe Gly
        170                 175                 180

atc ccg ttc cgt acg act tac gct gcc tcc aag cac gca gcc ctg ggc    930
Ile Pro Phe Arg Thr Thr Tyr Ala Ala Ser Lys His Ala Ala Leu Gly
185             190                 195                 200

ttc ttt gac tgc ctc cga gcc gaa gtg gag gaa tac gat gtt gtc atc    978
Phe Phe Asp Cys Leu Arg Ala Glu Val Glu Glu Tyr Asp Val Val Ile
            205                 210                 215

agc acc gtg agc ccg act ttc atc cgg tcg tac cac gtg tat cca gag    1026
Ser Thr Val Ser Pro Thr Phe Ile Arg Ser Tyr His Val Tyr Pro Glu
            220                 225                 230

caa gga aac tgg gaa gct tcc att tgg aaa ttc ttt ttc agg aag ctg    1074
Gln Gly Asn Trp Glu Ala Ser Ile Trp Lys Phe Phe Phe Arg Lys Leu
            235                 240                 245

acc tac ggc gtg cac cca gta gag gtg gcg gag gag gtg atg cgc acc    1122
Thr Tyr Gly Val His Pro Val Glu Val Ala Glu Glu Val Met Arg Thr
250                 255                 260
```

```
gtg cgg agg aag aag caa gag gtg ttt atg gcc aac ccc atc ccc aag    1170
Val Arg Arg Lys Lys Gln Glu Val Phe Met Ala Asn Pro Ile Pro Lys
265                 270                 275                 280

gcc gcc gtg tac gtc cgc acc ttc ttc ccg gag ttc ttt ttc gcc gtg    1218
Ala Ala Val Tyr Val Arg Thr Phe Phe Pro Glu Phe Phe Phe Ala Val
                285                 290                 295

gtg gcc tgt ggg gtg aag gag aag ctc aat gtc ccg gag gag ggg    1263
Val Ala Cys Gly Val Lys Glu Lys Leu Asn Val Pro Glu Glu Gly
                300                 305                 310

taactgcagg aggccaaatg gccacccct tggaaataaa ggtttttctg gcaaaaaaaa 1323

aaaaaaaaaa aaantttgcg ccgcaagct tattcccttt agggagggtt aatttt      1379
```

<210> 5
<211> 311
<212> PRT
<213> Homo sapiens

<400> 5

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Met Gly Val Met Ala Met Leu Met Leu Pro Leu Leu Leu Leu Gly Ile
1               5                   10                  15

Ser Gly Leu Leu Phe Ile Tyr Gln Glu Val Ser Arg Leu Trp Ser Lys
            20                  25                  30

Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
            35                  40                  45

Leu Gly Lys Glu Cys Ala Arg Val Phe His Thr Gly Gly Ala Arg Leu
    50                  55                  60

Val Leu Cys Gly Lys Asn Trp Glu Arg Leu Glu Asn Leu Tyr Asp Ala
65                  70                  75                  80

Leu Ile Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
                85                  90                  95

Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Pro Asp Val Ala Lys Glu
            100                 105                 110

Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
            115                 120                 125

Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
    130                 135                 140

Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Ala
145                 150                 155                 160

Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
                165                 170                 175

Asn Asn Ile Gln Gly Lys Phe Gly Ile Pro Phe Arg Thr Thr Tyr Ala
            180                 185                 190

Ala Ser Lys His Ala Ala Leu Gly Phe Phe Asp Cys Leu Arg Ala Glu
    195                 200                 205
```

```
Val Glu Glu Tyr Asp Val Val Ile Ser Thr Val Ser Pro Thr Phe Ile
    210             215             220
```

```
Arg Ser Tyr His Val Tyr Pro Glu Gln Gly Asn Trp Glu Ala Ser Ile
225             230             235             240
```

```
Trp Lys Phe Phe Phe Arg Lys Leu Thr Tyr Gly Val His Pro Val Glu
            245             250             255
```

```
Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
        260             265             270
```

```
Phe Met Ala Asn Pro Ile Pro Lys Ala Ala Val Tyr Val Arg Thr Phe
        275             280             285
```

```
Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys
    290             295             300
```

```
Leu Asn Val Pro Glu Glu Gly
305             310
```

<210> 6
<211> 933
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(933)

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<400> 6
atg gga gtc atg gcc atg ctg atg ctc ccc ctg ctg ctg ctg gga atc      48
Met Gly Val Met Ala Met Leu Met Leu Pro Leu Leu Leu Leu Gly Ile
 1             5                 10                  15
```

```
agc ggc ctc ctc ttc att tac caa gag gtg tcc agg ctg tgg tca aag      96
Ser Gly Leu Leu Phe Ile Tyr Gln Glu Val Ser Arg Leu Trp Ser Lys
            20                  25                  30
```

```
tca gct gtg cag aac aaa gtg gtg gtg atc acc gat gcc atc tca gga     144
Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
        35                  40                  45
```

```
ctg ggc aag gag tgt gct cgg gtg ttc cac aca ggt ggg gca agg ctg     192
Leu Gly Lys Glu Cys Ala Arg Val Phe His Thr Gly Gly Ala Arg Leu
    50                  55                  60
```

```
gtg ctg tgt gga aag aac tgg gag agg cta gag aac cta tat gat gcc     240
Val Leu Cys Gly Lys Asn Trp Glu Arg Leu Glu Asn Leu Tyr Asp Ala
65                  70                  75                  80
```

```
ttg atc agc gtg gct gac ccc agc aag aca ttc acc cca aag ctg gtc     288
Leu Ile Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
                85                  90                  95
```

```
ctg ttg gac ctc tca gac atc agc tgt gtc cca gat gtg gca aaa gaa     336
Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Pro Asp Val Ala Lys Glu
            100                 105                 110
```

```
gtc ctg gat tgc tat ggc tgt gtg gac atc ctc atc aac aat gcc agt    384
Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
        115             120             125

gtg aag gtg aag ggg cct gcc cat aag att tct ctg gag ctc gac aaa    432
Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
        130             135             140

aag atc atg gat gcc aat tac ttt ggc ccc atc aca ttg acg aaa gcc    480
Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Ala
145             150             155             160

ctg ctt ccc aac atg atc tcc cgg aga aca ggc caa atc gtg tta gtg    528
Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
                165             170             175

aat aat atc caa ggg aag ttt gga atc ccg ttc cgt acg act tac gct    576
Asn Asn Ile Gln Gly Lys Phe Gly Ile Pro Phe Arg Thr Thr Tyr Ala
                180             185             190

gcc tcc aag cac gca gcc ctg ggc ttc ttt gac tgc ctc cga gcc gaa    624
Ala Ser Lys His Ala Ala Leu Gly Phe Phe Asp Cys Leu Arg Ala Glu
                195             200             205

gtg gag gaa tac gat gtt gtc atc agc acc gtg agc ccg act ttc atc    672
Val Glu Glu Tyr Asp Val Val Ile Ser Thr Val Ser Pro Thr Phe Ile
        210             215             220

cgg tcg tac cac gtg tat cca gag caa gga aac tgg gaa gct tcc att    720
Arg Ser Tyr His Val Tyr Pro Glu Gln Gly Asn Trp Glu Ala Ser Ile
225             230             235             240

tgg aaa ttc ttt ttc agg aag ctg acc tac ggc gtg cac cca gta gag    768
Trp Lys Phe Phe Phe Arg Lys Leu Thr Tyr Gly Val His Pro Val Glu
                245             250             255

gtg gcg gag gag gtg atg cgc acc gtg cgg agg aag aag caa gag gtg    816
Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
                260             265             270

ttt atg gcc aac ccc atc ccc aag gcc gcc gtg tac gtc cgc acc ttc    864
Phe Met Ala Asn Pro Ile Pro Lys Ala Ala Val Tyr Val Arg Thr Phe
                275             280             285

ttc ccg gag ttc ttt ttc gcc gtg gtg gcc tgt ggg gtg aag gag aag    912
Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys
        290             295             300

                                                                    933
ctc aat gtc ccg gag gag ggg
Leu Asn Val Pro Glu Glu Gly
305             310
```

```
<210>  7
<211>  1725
<212>  DNA
<213>  Homo sapiens

<220>
<221>  CDS
<222>  (281)..(1387)
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<220>
<221> misc_feature
<222> (1)..(1725)
<223> All occurrences of n = any nucleotide

<400> 7
gagaaggagg agccagcgga aggacggtgt gcgggccggc cagccctgga cgaaagaaga  60

gggcccctcc aggccagtct gggcaccctg ggatagcggc tgcagccatc agcaggggca  120

gacggcaggt ggcctggttg ctgcagctcc caggatcagc tctgccctcc ccgcaaacgc  180

cagcctcgtc accgctccag ggcacctcca gcagtaacag gtggttgcag caggtggcag  240

ccagcccctg gatgagccaa ggtctcttcc ccagccaggc atg gcc gac tct gca  295
                                             Met Ala Asp Ser Ala
                                             1               5

cag gcc cag aag ctg gtg tac ctg gtc aca ggg ggc tgt ggc ttc ctg  343
Gln Ala Gln Lys Leu Val Tyr Leu Val Thr Gly Gly Cys Gly Phe Leu
              10              15              20

gga gag cac gtg gtg cga atg ctg ctg cag cgg gag ccc cgg ctc ggg  391
Gly Glu His Val Val Arg Met Leu Leu Gln Arg Glu Pro Arg Leu Gly
          25              30              35

gag ctg cgg gtc ttt gac caa cac ctg ggt ccc tgg ctg gag gag ctg  439
Glu Leu Arg Val Phe Asp Gln His Leu Gly Pro Trp Leu Glu Glu Leu
      40              45              50

aag aca ggg cct gtg agg gtg act gcc atc cag ggg gac gtg acc cag  487
Lys Thr Gly Pro Val Arg Val Thr Ala Ile Gln Gly Asp Val Thr Gln
  55              60              65

gcc cat gag gtg gca gca gct gtg gcc gga gcc cat gtg gtc atc cac  535
Ala His Glu Val Ala Ala Ala Val Ala Gly Ala His Val Val Ile His
70              75              80              85

acg gct ggg ctg gta gac gtg ttt ggc agg gcc agt ccc aag acc atc  583
Thr Ala Gly Leu Val Asp Val Phe Gly Arg Ala Ser Pro Lys Thr Ile
              90              95              100

cat gag gtc aac gtg cag ggt acc cgg aac gtg atc gag gct tgt gtg  631
His Glu Val Asn Val Gln Gly Thr Arg Asn Val Ile Glu Ala Cys Val
          105             110             115

cag acc gga aca cgg ttc ctg gtc tac acc agc agc atg gaa gtt gtg  679
Gln Thr Gly Thr Arg Phe Leu Val Tyr Thr Ser Ser Met Glu Val Val
          120             125             130

ggg cct aac acc aaa ggt cac ccc ttc tac agg ggc aac gaa gac acc  727
Gly Pro Asn Thr Lys Gly His Pro Phe Tyr Arg Gly Asn Glu Asp Thr
      135             140             145

cca tac gaa gca gtg cac agg cac ccc tat cct tgc agc aag gcc ctg  775
Pro Tyr Glu Ala Val His Arg His Pro Tyr Pro Cys Ser Lys Ala Leu
150             155             160             165
```

```
gcc gag tgg ctg gtc ctg gag gcc aac ggg agg aag gtc cgt ggg ggg    823
Ala Glu Trp Leu Val Leu Glu Ala Asn Gly Arg Lys Val Arg Gly Gly
                170             175             180

ctg ccc ctg gtg acg tgt gcc ctt cgt ccc acg ggc atc tac ggt gaa    871
Leu Pro Leu Val Thr Cys Ala Leu Arg Pro Thr Gly Ile Tyr Gly Glu
                185             190             195

ggc cac cag atc atg agg gac ttc tac cgc cag ggc ctg cgc ctg gga    919
Gly His Gln Ile Met Arg Asp Phe Tyr Arg Gln Gly Leu Arg Leu Gly
                200             205             210

ggt tgg ctc ttc cgg gcc atc ccg gcc tct gtg gag cat ggc cgg gtc    967
Gly Trp Leu Phe Arg Ala Ile Pro Ala Ser Val Glu His Gly Arg Val
                215             220             225

tat gtg ggc aat gtt gcc tgg atg cac gtg ctg gca gcc cgg gag ctg   1015
Tyr Val Gly Asn Val Ala Trp Met His Val Leu Ala Ala Arg Glu Leu
230             235             240             245

gag cag cgg gca gcc ctg atg ggc ggc cag gta tac ttc tgc tac gat   1063
Glu Gln Arg Ala Ala Leu Met Gly Gly Gln Val Tyr Phe Cys Tyr Asp
                250             255             260

gga tca ccc tac agg agc tac gag gat ttc aac atg gag ttc ctg ggc   1111
Gly Ser Pro Tyr Arg Ser Tyr Glu Asp Phe Asn Met Glu Phe Leu Gly
                265             270             275

ccc tgc gga ctg cgg ctg gtg ggc gcc cgc cca ttg ctg ccc tac tgg   1159
Pro Cys Gly Leu Arg Leu Val Gly Ala Arg Pro Leu Leu Pro Tyr Trp
                280             285             290

ctg ctg gtg ttc ctg gct gcc ctc aat gcc ctg ctg cag tgg ctg ctg   1207
Leu Leu Val Phe Leu Ala Ala Leu Asn Ala Leu Leu Gln Trp Leu Leu
                295             300             305

cgg cca ctg gtg ctc tac gca ccc ctg ctg aac ccc tac acg ctg gcc   1255
Arg Pro Leu Val Leu Tyr Ala Pro Leu Leu Asn Pro Tyr Thr Leu Ala
310             315             320             325

gtg gcc aac acc acc ttc acc gtc agc acc gac aag gct cag cgc cat   1303
Val Ala Asn Thr Thr Phe Thr Val Ser Thr Asp Lys Ala Gln Arg His
                330             335             340

ttc ggc tat gag ccc ctg ttc tcg tgg gag gat agc cgg acc cgc acc   1351
Phe Gly Tyr Glu Pro Leu Phe Ser Trp Glu Asp Ser Arg Thr Arg Thr
                345             350             355

att ctc tgg gta cag gcc gct acg ggt tca gcc cag tgacggtggg         1397
Ile Leu Trp Val Gln Ala Ala Thr Gly Ser Ala Gln
                360             365

gctggggcct ggaggcccag atacagcaca tccacccagg tcccgagccc tcacaccctg 1457

gacgggaagg gacagctgca ttccagagca ggaggcaggg ctctggggcc agaatggctg 1517

tccttgtcgt agagccctcc acattttctt tttctttttt gagacagggt cttgctctgt 1577

cacccagact ggaatgcaag tggtgtgant cataagctca ctngmaccct yaanccttct 1637

gggttcaagc aatccttnct ngcctyaanc cttctngaac aagcttggga nccacaggtg 1697
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cacgccancc acancctggc tttttttt

<210> 8
<211> 369
<212> PRT
<213> Homo sapiens

<400> 8

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Met Ala Asp Ser Ala Gln Ala Gln Lys Leu Val Tyr Leu Val Thr Gly
 1               5                  10                  15

Gly Cys Gly Phe Leu Gly Glu His Val Val Arg Met Leu Leu Gln Arg
                20                  25                  30

Glu Pro Arg Leu Gly Glu Leu Arg Val Phe Asp Gln His Leu Gly Pro
            35                  40                  45

Trp Leu Glu Glu Leu Lys Thr Gly Pro Val Arg Val Thr Ala Ile Gln
    50                  55                  60

Gly Asp Val Thr Gln Ala His Glu Val Ala Ala Ala Val Ala Gly Ala
65                  70                  75                  80

His Val Val Ile His Thr Ala Gly Leu Val Asp Val Phe Gly Arg Ala
                85                  90                  95

Ser Pro Lys Thr Ile His Glu Val Asn Val Gln Gly Thr Arg Asn Val
            100                 105                 110

Ile Glu Ala Cys Val Gln Thr Gly Thr Arg Phe Leu Val Tyr Thr Ser
    115                 120                 125

Ser Met Glu Val Val Gly Pro Asn Thr Lys Gly His Pro Phe Tyr Arg
    130                 135                 140

Gly Asn Glu Asp Thr Pro Tyr Glu Ala Val His Arg His Pro Tyr Pro
145                 150                 155                 160

Cys Ser Lys Ala Leu Ala Glu Trp Leu Val Leu Glu Ala Asn Gly Arg
                165                 170                 175

Lys Val Arg Gly Gly Leu Pro Leu Val Thr Cys Ala Leu Arg Pro Thr
            180                 185                 190

Gly Ile Tyr Gly Glu Gly His Gln Ile Met Arg Asp Phe Tyr Arg Gln
            195                 200                 205

Gly Leu Arg Leu Gly Gly Trp Leu Phe Arg Ala Ile Pro Ala Ser Val
    210                 215                 220

Glu His Gly Arg Val Tyr Val Gly Asn Val Ala Trp Met His Val Leu
225                 230                 235                 240

Ala Ala Arg Glu Leu Glu Gln Arg Ala Ala Leu Met Gly Gly Gln Val
                245                 250                 255

Tyr Phe Cys Tyr Asp Gly Ser Pro Tyr Arg Ser Tyr Glu Asp Phe Asn
                260                 265                 270
```

```
Met Glu Phe Leu Gly Pro Cys Gly Leu Arg Leu Val Gly Ala Arg Pro
        275             280             285

Leu Leu Pro Tyr Trp Leu Leu Val Phe Leu Ala Ala Leu Asn Ala Leu
        290             295             300

Leu Gln Trp Leu Leu Arg Pro Leu Val Leu Tyr Ala Pro Leu Leu Asn
305             310             315             320

Pro Tyr Thr Leu Ala Val Ala Asn Thr Thr Phe Thr Val Ser Thr Asp
                325             330             335

Lys Ala Gln Arg His Phe Gly Tyr Glu Pro Leu Phe Ser Trp Glu Asp
            340             345             350

Ser Arg Thr Arg Thr Ile Leu Trp Val Gln Ala Ala Thr Gly Ser Ala
        355             360             365

Gln
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<210> 9
<211> 1107
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(1107)

<400> 9
atg gcc gac tct gca cag gcc cag aag ctg gtg tac ctg gtc aca ggg      48
Met Ala Asp Ser Ala Gln Ala Gln Lys Leu Val Tyr Leu Val Thr Gly
 1               5              10              15

ggc tgt ggc ttc ctg gga gag cac gtg gtg cga atg ctg ctg cag cgg      96
Gly Cys Gly Phe Leu Gly Glu His Val Val Arg Met Leu Leu Gln Arg
            20              25              30

gag ccc cgg ctc ggg gag ctg cgg gtc ttt gac caa cac ctg ggt ccc     144
Glu Pro Arg Leu Gly Glu Leu Arg Val Phe Asp Gln His Leu Gly Pro
        35              40              45

tgg ctg gag gag ctg aag aca ggg cct gtg agg gtg act gcc atc cag     192
Trp Leu Glu Glu Leu Lys Thr Gly Pro Val Arg Val Thr Ala Ile Gln
    50              55              60

ggg gac gtg acc cag gcc cat gag gtg gca gca gct gtg gcc gga gcc     240
Gly Asp Val Thr Gln Ala His Glu Val Ala Ala Ala Val Ala Gly Ala
65              70              75              80

cat gtg gtc atc cac acg gct ggg ctg gta gac gtg ttt ggc agg gcc     288
His Val Val Ile His Thr Ala Gly Leu Val Asp Val Phe Gly Arg Ala
                85              90              95

agt ccc aag acc atc cat gag gtc aac gtg cag ggt acc cgg aac gtg     336
Ser Pro Lys Thr Ile His Glu Val Asn Val Gln Gly Thr Arg Asn Val
            100             105             110
```

```
atc gag gct tgt gtg cag acc gga aca cgg ttc ctg gtc tac acc agc    384
Ile Glu Ala Cys Val Gln Thr Gly Thr Arg Phe Leu Val Tyr Thr Ser
        115             120             125

agc atg gaa gtt gtg ggg cct aac acc aaa ggt cac ccc ttc tac agg    432
Ser Met Glu Val Val Gly Pro Asn Thr Lys Gly His Pro Phe Tyr Arg
    130             135             140

ggc aac gaa gac acc cca tac gaa gca gtg cac agg cac ccc tat cct    480
Gly Asn Glu Asp Thr Pro Tyr Glu Ala Val His Arg His Pro Tyr Pro
145             150             155             160

tgc agc aag gcc ctg gcc gag tgg ctg gtc ctg gag gcc aac ggg agg    528
Cys Ser Lys Ala Leu Ala Glu Trp Leu Val Leu Glu Ala Asn Gly Arg
            165             170             175

aag gtc cgt ggg ggg ctg ccc ctg gtg acg tgt gcc ctt cgt ccc acg    576
Lys Val Arg Gly Gly Leu Pro Leu Val Thr Cys Ala Leu Arg Pro Thr
        180             185             190

ggc atc tac ggt gaa ggc cac cag atc atg agg gac ttc tac cgc cag    624
Gly Ile Tyr Gly Glu Gly His Gln Ile Met Arg Asp Phe Tyr Arg Gln
        195             200             205

ggc ctg cgc ctg gga ggt tgg ctc ttc cgg gcc atc ccg gcc tct gtg    672
Gly Leu Arg Leu Gly Gly Trp Leu Phe Arg Ala Ile Pro Ala Ser Val
    210             215             220

gag cat ggc cgg gtc tat gtg ggc aat gtt gcc tgg atg cac gtg ctg    720
Glu His Gly Arg Val Tyr Val Gly Asn Val Ala Trp Met His Val Leu
225             230             235             240

gca gcc cgg gag ctg gag cag cgg gca gcc ctg atg ggc ggc cag gta    768
Ala Ala Arg Glu Leu Glu Gln Arg Ala Ala Leu Met Gly Gly Gln Val
            245             250             255

tac ttc tgc tac gat gga tca ccc tac agg agc tac gag gat ttc aac    816
Tyr Phe Cys Tyr Asp Gly Ser Pro Tyr Arg Ser Tyr Glu Asp Phe Asn
            260             265             270

atg gag ttc ctg ggc ccc tgc gga ctg cgg ctg gtg ggc gcc cgc cca    864
Met Glu Phe Leu Gly Pro Cys Gly Leu Arg Leu Val Gly Ala Arg Pro
        275             280             285

ttg ctg ccc tac tgg ctg ctg gtg ttc ctg gct gcc ctc aat gcc ctg    912
Leu Leu Pro Tyr Trp Leu Leu Val Phe Leu Ala Ala Leu Asn Ala Leu
        290             295             300

ctg cag tgg ctg ctg cgg cca ctg gtg ctc tac gca ccc ctg ctg aac    960
Leu Gln Trp Leu Leu Arg Pro Leu Val Leu Tyr Ala Pro Leu Leu Asn
305             310             315             320

ccc tac acg ctg gcc gtg gcc aac acc acc ttc acc gtc agc acc gac   1008
Pro Tyr Thr Leu Ala Val Ala Asn Thr Thr Phe Thr Val Ser Thr Asp
            325             330             335

aag gct cag cgc cat ttc ggc tat gag ccc ctg ttc tcg tgg gag gat   1056
Lys Ala Gln Arg His Phe Gly Tyr Glu Pro Leu Phe Ser Trp Glu Asp
        340             345             350
```

```
agc cgg acc cgc acc att ctc tgg gta cag gcc gct acg ggt tca gcc      1104
Ser Arg Thr Arg Thr Ile Leu Trp Val Gln Ala Ala Thr Gly Ser Ala
        355                 360                 365


                                                                      1107
cag
Gln


<210> 10
<211> 1209
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (61)..(1026)

<400> 10
cccacgcgtc cgcccacgcg tccgcggacg cgtgggcgga cgcgtgggcg cccgcctcga   60

atg tcc ctg aga ccc aga agg gcc tgc gct cag ctg ctc tgg cac ccc      108
Met Ser Leu Arg Pro Arg Arg Ala Cys Ala Gln Leu Leu Trp His Pro
1           5                   10                  15

gct gca ggg atg gcc tcc tgg gct aag ggc agg agc tac ctg gcg cct      156
Ala Ala Gly Met Ala Ser Trp Ala Lys Gly Arg Ser Tyr Leu Ala Pro
            20                  25                  30

ggt ttg ctg cag ggc caa gtg gcc atc gtc acc ggc ggg gcc acg ggc      204
Gly Leu Leu Gln Gly Gln Val Ala Ile Val Thr Gly Gly Ala Thr Gly
        35                  40                  45

atc gga aaa gcc atc gtg aag gag ctc ctg gag ctg ggg agt aat gtg      252
Ile Gly Lys Ala Ile Val Lys Glu Leu Leu Glu Leu Gly Ser Asn Val
    50                  55                  60

gtc att gca tcc cgt aag ttg gag aga ttg aag tct gcg gca gat gaa      300
Val Ile Ala Ser Arg Lys Leu Glu Arg Leu Lys Ser Ala Ala Asp Glu
65                  70                  75                  80

ctg cag gcc aac cta cct ccc aca aag cag gca cga gtc att ccc ata      348
Leu Gln Ala Asn Leu Pro Pro Thr Lys Gln Ala Arg Val Ile Pro Ile
                85                  90                  95

caa tgc aac atc cgg aat gag gag gag gtg aat aat ttg gtc aaa tct      396
Gln Cys Asn Ile Arg Asn Glu Glu Glu Val Asn Asn Leu Val Lys Ser
            100                 105                 110

acc tta gat act ttt ggt aag atc aat ttc ttg gtg aac aat gga gga      444
Thr Leu Asp Thr Phe Gly Lys Ile Asn Phe Leu Val Asn Asn Gly Gly
        115                 120                 125

ggc cag ttt ctt tcc cct gct gaa cac atc agt tct aag gga tgg cac      492
Gly Gln Phe Leu Ser Pro Ala Glu His Ile Ser Ser Lys Gly Trp His
    130                 135                 140

gct gtg ctt gag acc aac ctg acg ggt acc ttc tac atg tgc aaa gca      540
Ala Val Leu Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala
145                 150                 155                 160
```

```
gtt tac agc tcc tgg atg aaa gag cat gga gga tct atc gtc aat atc    588
Val Tyr Ser Ser Trp Met Lys Glu His Gly Gly Ser Ile Val Asn Ile
                165                 170                 175

att gtc cct act aaa gct gga ttt cca tta gct gtg cat tct gga gct    636
Ile Val Pro Thr Lys Ala Gly Phe Pro Leu Ala Val His Ser Gly Ala
                180                 185                 190

gca aga gca ggt gtt tac aac ctc acc aaa tct tta gct ttg gaa tgg    684
Ala Arg Ala Gly Val Tyr Asn Leu Thr Lys Ser Leu Ala Leu Glu Trp
                195                 200                 205

gcc tgc agt gga ata cgg atc aat tgt gtt gcc cct gga gtt att tat    732
Ala Cys Ser Gly Ile Arg Ile Asn Cys Val Ala Pro Gly Val Ile Tyr
            210                 215                 220

tcc cag act gct gtg gag aac tat ggt tcc tgg gga caa agc ttc ttt    780
Ser Gln Thr Ala Val Glu Asn Tyr Gly Ser Trp Gly Gln Ser Phe Phe
225                 230                 235                 240

gaa ggg tct ttt cag aaa atc ccc gct aaa cga att ggt gtt cct gag    828
Glu Gly Ser Phe Gln Lys Ile Pro Ala Lys Arg Ile Gly Val Pro Glu
                245                 250                 255

gag gtc tcc tct gtg gtc tgc ttc cta ctg tct cct gca gct tcc ttc    876
Glu Val Ser Ser Val Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe
                260                 265                 270

atc act gga cag tcg gtg gat gtg gat ggg ggc cgg agt ctc tat act    924
Ile Thr Gly Gln Ser Val Asp Val Asp Gly Gly Arg Ser Leu Tyr Thr
                275                 280                 285

cac tcg tat gag gta cca gat cat gac aac tgg ccc aag gga gca ggg    972
His Ser Tyr Glu Val Pro Asp His Asp Asn Trp Pro Lys Gly Ala Gly
        290                 295                 300

gac ctt tct gtt gtc aaa aag atg aag gag acc tta aag gag aaa gct   1020
Asp Leu Ser Val Val Lys Lys Met Lys Glu Thr Leu Lys Glu Lys Ala
305                 310                 315                 320

aag ctc tgagctgagg aaacaaggtg tcctccatcc ccagtgcctt cacatcttga   1076
Lys Leu

ggatatgctt ctgtactttt taaaagctta tagttggtat ggaaaacatt tttcttattt   1136

ttaagtgtta ttaattatat ctatggaaaa actattcctg aaatatatac agtcttatgt   1196

cccaaaaaaa aaa                                                      1209
```

<210> 11
<211> 322
<212> PRT
<213> Homo sapiens

<400> 11
```
Met Ser Leu Arg Pro Arg Arg Ala Cys Ala Gln Leu Leu Trp His Pro
  1               5                  10                  15

Ala Ala Gly Met Ala Ser Trp Ala Lys Gly Arg Ser Tyr Leu Ala Pro
            20                  25                  30
```

Gly Leu Leu Gln Gly Gln Val Ala Ile Val Thr Gly Gly Ala Thr Gly
            35   40   45

Ile Gly Lys Ala Ile Val Lys Glu Leu Leu Glu Leu Gly Ser Asn Val
        50   55   60

Val Ile Ala Ser Arg Lys Leu Glu Arg Leu Lys Ser Ala Ala Asp Glu
65   70   75   80

Leu Gln Ala Asn Leu Pro Pro Thr Lys Gln Ala Arg Val Ile Pro Ile
                85   90   95

Gln Cys Asn Ile Arg Asn Glu Glu Glu Val Asn Asn Leu Val Lys Ser
            100   105   110

Thr Leu Asp Thr Phe Gly Lys Ile Asn Phe Leu Val Asn Asn Gly Gly
        115   120   125

Gly Gln Phe Leu Ser Pro Ala Glu His Ile Ser Ser Lys Gly Trp His
        130   135   140

Ala Val Leu Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala
145   150   155   160

Val Tyr Ser Ser Trp Met Lys Glu His Gly Gly Ser Ile Val Asn Ile
            165   170   175

Ile Val Pro Thr Lys Ala Gly Phe Pro Leu Ala Val His Ser Gly Ala
            180   185   190

Ala Arg Ala Gly Val Tyr Asn Leu Thr Lys Ser Leu Ala Leu Glu Trp
        195   200   ·205

Ala Cys Ser Gly Ile Arg Ile Asn Cys Val Ala Pro Gly Val Ile Tyr
        210   215   220

Ser Gln Thr Ala Val Glu Asn Tyr Gly Ser Trp Gly Gln Ser Phe Phe
225   230   235   240

Glu Gly Ser Phe Gln Lys Ile Pro Ala Lys Arg Ile Gly Val Pro Glu
            245   250   255

Glu Val Ser Ser Val Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe
            260   265   270

Ile Thr Gly Gln Ser Val Asp Val Asp Gly Gly Arg Ser Leu Tyr Thr
        275   280   285

His Ser Tyr Glu Val Pro Asp His Asp Asn Trp Pro Lys Gly Ala Gly
        290   295   300

Asp Leu Ser Val Val Lys Lys Met Lys Glu Thr Leu Lys Glu Lys Ala
305   310   315   320

Lys Leu

```
<210> 12
<211> 966
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(966)

<400> 12
atg tcc ctg aga ccc aga agg gcc tgc gct cag ctg ctc tgg cac ccc      48
Met Ser Leu Arg Pro Arg Arg Ala Cys Ala Gln Leu Leu Trp His Pro
 1               5                  10                  15

gct gca ggg atg gcc tcc tgg gct aag ggc agg agc tac ctg gcg cct      96
Ala Ala Gly Met Ala Ser Trp Ala Lys Gly Arg Ser Tyr Leu Ala Pro
                20                  25                  30

ggt ttg ctg cag ggc caa gtg gcc atc gtc acc ggc ggg gcc acg ggc     144
Gly Leu Leu Gln Gly Gln Val Ala Ile Val Thr Gly Gly Ala Thr Gly
            35                  40                  45

atc gga aaa gcc atc gtg aag gag ctc ctg gag ctg ggg agt aat gtg     192
Ile Gly Lys Ala Ile Val Lys Glu Leu Leu Glu Leu Gly Ser Asn Val
        50                  55                  60

gtc att gca tcc cgt aag ttg gag aga ttg aag tct gcg gca gat gaa     240
Val Ile Ala Ser Arg Lys Leu Glu Arg Leu Lys Ser Ala Ala Asp Glu
 65                  70                  75                  80

ctg cag gcc aac cta cct ccc aca aag cag gca cga gtc att ccc ata     288
Leu Gln Ala Asn Leu Pro Pro Thr Lys Gln Ala Arg Val Ile Pro Ile
                85                  90                  95

caa tgc aac atc cgg aat gag gag gag gtg aat aat ttg gtc aaa tct     336
Gln Cys Asn Ile Arg Asn Glu Glu Glu Val Asn Asn Leu Val Lys Ser
            100                 105                 110

acc tta gat act ttt ggt aag atc aat ttc ttg gtg aac aat gga gga     384
Thr Leu Asp Thr Phe Gly Lys Ile Asn Phe Leu Val Asn Asn Gly Gly
            115                 120                 125

ggc cag ttt ctt tcc cct gct gaa cac atc agt tct aag gga tgg cac     432
Gly Gln Phe Leu Ser Pro Ala Glu His Ile Ser Ser Lys Gly Trp His
        130                 135                 140

gct gtg ctt gag acc aac ctg acg ggt acc ttc tac atg tgc aaa gca     480
Ala Val Leu Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala
145                 150                 155                 160

gtt tac agc tcc tgg atg aaa gag cat gga gga tct atc gtc aat atc     528
Val Tyr Ser Ser Trp Met Lys Glu His Gly Gly Ser Ile Val Asn Ile
                165                 170                 175

att gtc cct act aaa gct gga ttt cca tta gct gtg cat tct gga gct     576
Ile Val Pro Thr Lys Ala Gly Phe Pro Leu Ala Val His Ser Gly Ala
                180                 185                 190

gca aga gca ggt gtt tac aac ctc acc aaa tct tta gct ttg gaa tgg     624
Ala Arg Ala Gly Val Tyr Asn Leu Thr Lys Ser Leu Ala Leu Glu Trp
            195                 200                 205
```

```
gcc tgc agt gga ata cgg atc aat tgt gtt gcc cct gga gtt att tat    672
Ala Cys Ser Gly Ile Arg Ile Asn Cys Val Ala Pro Gly Val Ile Tyr
    210             215             220

tcc cag act gct gtg gag aac tat ggt tcc tgg gga caa agc ttc ttt    720
Ser Gln Thr Ala Val Glu Asn Tyr Gly Ser Trp Gly Gln Ser Phe Phe
225                 230             235             240

gaa ggg tct ttt cag aaa atc ccc gct aaa cga att ggt gtt cct gag    768
Glu Gly Ser Phe Gln Lys Ile Pro Ala Lys Arg Ile Gly Val Pro Glu
            245             250             255

gag gtc tcc tct gtg gtc tgc ttc cta ctg tct cct gca gct tcc ttc    816
Glu Val Ser Ser Val Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe
            260             265             270

atc act gga cag tcg gtg gat gtg gat ggg ggc cgg agt ctc tat act    864
Ile Thr Gly Gln Ser Val Asp Val Asp Gly Gly Arg Ser Leu Tyr Thr
            275             280             285

cac tcg tat gag gta cca gat cat gac aac tgg ccc aag gga gca ggg    912
His Ser Tyr Glu Val Pro Asp His Asp Asn Trp Pro Lys Gly Ala Gly
    290             295             300

gac ctt tct gtt gtc aaa aag atg aag gag acc tta aag gag aaa gct    960
Asp Leu Ser Val Val Lys Lys Met Lys Glu Thr Leu Lys Glu Lys Ala
305             310             315             320

                                                                  966
aag ctc
Lys Leu
```

<210> 13
<211> 303
<212> PRT
<213> Rattus norvegicus

<400> 13

```
Met Gly Ser Trp Lys Ser Gly Gln Ser Tyr Leu Ala Ala Gly Leu Leu
1               5               10              15

Gln Asn Gln Val Ala Val Val Thr Gly Gly Ala Thr Gly Ile Gly Lys
            20              25              30

Ala Ile Ser Arg Glu Leu Leu His Leu Gly Cys Asn Val Val Ile Ala
    35              40              45

Ser Arg Lys Leu Asp Arg Leu Thr Ala Ala Val Asp Glu Leu Arg Ala
    50              55              60

Ser Gln Pro Pro Ser Ser Ser Thr Gln Val Thr Ala Ile Gln Cys Asn
65              70              75              80

Ile Arg Lys Glu Glu Glu Val Asn Asn Leu Val Lys Ser Thr Leu Ala
            85              90              95

Lys Tyr Gly Lys Ile Asn Phe Leu Val Asn Asn Ala Gly Gly Gln Phe
    100             105             110
```

```
Met Ala Pro Ala Glu Asp Ile Thr Ala Lys Gly Trp Gln Ala Val Ile
            115             120             125

Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala Val Tyr Asn
    130             135             140

Ser Trp Met Lys Asp His Gly Gly Ser Ile Val Asn Ile Ile Val Leu
145             150             155             160

Leu Asn Asn Gly Phe Pro Thr Ala Ala His Ser Gly Ala Ala Arg Ala
                165             170             175

Gly Val Tyr Asn Leu Thr Lys Thr Met Ala Leu Thr Trp Ala Ser Ser
            180             185             190

Gly Val Arg Ile Asn Cys Val Ala Pro Gly Thr Ile Tyr Ser Gln Thr
        195             200             205

Ala Val Asp Asn Tyr Gly Glu Leu Gly Gln Thr Met Phe Glu Met Ala
    210             215             220

Phe Glu Asn Ile Pro Ala Lys Arg Val Gly Leu Pro Glu Glu Ile Ser
225             230             235             240

Pro Leu Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe Ile Thr Gly
                245             250             255

Gln Leu Ile Asn Val Asp Gly Gly Gln Ala Leu Tyr Thr Arg Asn Phe
            260             265             270

Thr Ile Pro Asp His Asp Asn Trp Pro Val Gly Ala Gly Asp Ser Ser
        275             280             285

Phe Ile Lys Lys Val Lys Glu Ser Leu Lys Lys Gln Ala Arg Leu
    290             295             300
```

<210> 14
<211> 1108
<212> DNA
<213> Mus musculus

<220>
<221> CDS
<222> (102)..(1034)

<400> 14
ggaatggatg ctgttggctt aaacctcccc ctgccctggg ggttgcaacc agggtctctg 60

caaagccaat cctttgtcat cccgctgtcc tgcagagcaa g atg ggg ctc atg gct 116
                                             Met Gly Leu Met Ala
                                             1   5

gtc ctg atg cta ccc ctg ctg ctg ctg gga atc agc ggc ctc ctc ttc 164
Val Leu Met Leu Pro Leu Leu Leu Leu Gly Ile Ser Gly Leu Leu Phe
            10   15   20

att tac cag gag gca tcc agg ctg tgg tcg aag tct gcc gtg cag aac 212
Ile Tyr Gln Glu Ala Ser Arg Leu Trp Ser Lys Ser Ala Val Gln Asn
        25   30   35

```
aaa gtg gtg gtc atc aca gat gcc atc tca gga ctg gga aag gag tgt     260
Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly Leu Gly Lys Glu Cys
        40              45                  50

gct cgg gtg ttc cat gca ggt ggg gca agg ctg gtg ctg tgt gga aag     308
Ala Arg Val Phe His Ala Gly Gly Ala Arg Leu Val Leu Cys Gly Lys
        55              60                  65

aac tgg gag gga ctg gag agc ctc tat gcc acc ttg acc agt gtg gct     356
Asn Trp Glu Gly Leu Glu Ser Leu Tyr Ala Thr Leu Thr Ser Val Ala
70              75                  80                  85

gac ccc agc aag aca ttc acc ccc aag ctg gtc ctc ctg gat ctc tca     404
Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val Leu Leu Asp Leu Ser
                90                  95                  100

gac att agc tgt gtt caa gat gtg gcc aaa gag gtc ctg gac tgc tac     452
Asp Ile Ser Cys Val Gln Asp Val Ala Lys Glu Val Leu Asp Cys Tyr
                105                 110                 115

ggc tgt gtg gac atc ctc atc aac aat gcc agc gtg aaa gtg aag ggg     500
Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser Val Lys Val Lys Gly
                120                 125                 130

cct gcc cac aag att tcc ctg gag ctt gac aaa aag atc atg gat gcc     548
Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys Lys Ile Met Asp Ala
    135                 140                 145

aac tac ttc gga ccc atc act tta acc aaa gtt ctg ctt ccc aac atg     596
Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Val Leu Leu Pro Asn Met
150                 155                 160                 165

atc tcc agg aga aca ggc cag att gtg tta gtg aac aac atc caa gcg     644
Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val Asn Asn Ile Gln Ala
                170                 175                 180

aag ttt gga atc ccg ttc cgc aca gct tat gca gcc tct aag cat gcc     692
Lys Phe Gly Ile Pro Phe Arg Thr Ala Tyr Ala Ala Ser Lys His Ala
                185                 190                 195

gtc atg ggc ttc ttt gac tgc ctc cga gcc gag gtt gag gaa tac gat     740
Val Met Gly Phe Phe Asp Cys Leu Arg Ala Glu Val Glu Glu Tyr Asp
            200                 205                 210

gtt gtg gtc agc acc gtg agc cca act ttc atc cgc tcc tac cgt gct     788
Val Val Val Ser Thr Val Ser Pro Thr Phe Ile Arg Ser Tyr Arg Ala
            215                 220                 225

tcc cct gag caa aga aac tgg gag aca tcc att tgt aaa ttc ttc tgc     836
Ser Pro Glu Gln Arg Asn Trp Glu Thr Ser Ile Cys Lys Phe Phe Cys
230                 235                 240                 245

agg aag cta gcc tat ggc gtg cac ccg gtg gag gtg gct gag gaa gtg     884
Arg Lys Leu Ala Tyr Gly Val His Pro Val Glu Val Ala Glu Glu Val
                250                 255                 260

atg cgc aca gta cgg agg aag aag caa gag gtg ttc atg gcc aac ccg     932
Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val Phe Met Ala Asn Pro
                265                 270                 275
```

```
gtt cct aag gct gcc gtg ttc atc cgc acc ttc ttc cct gag ttc ttc    980
Val Pro Lys Ala Ala Val Phe Ile Arg Thr Phe Phe Pro Glu Phe Phe
        280                 285                 290

ttc gct gtg gtg gcc tgt ggg gtg aag gag aag ctc aat gtc cca gaa   1028
Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys Leu Asn Val Pro Glu
        295                 300                 305

gag ggt taacctcgtg gccaagggg tcactcaagg ggaataaagg ctttcctaga    1084
Glu Gly
310

gaaaaaaaaa aaaaaaaaaa aaaa                                         1108
```

<210> 15
<211> 311
<212> PRT
<213> Mus musculus

<400> 15

```
Met Gly Leu Met Ala Val Leu Met Leu Pro Leu Leu Leu Gly Ile
  1           5                  10                  15

Ser Gly Leu Leu Phe Ile Tyr Gln Glu Ala Ser Arg Leu Trp Ser Lys
            20                  25                  30

Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
        35                  40                  45

Leu Gly Lys Glu Cys Ala Arg Val Phe His Ala Gly Gly Ala Arg Leu
    50                  55                  60

Val Leu Cys Gly Lys Asn Trp Glu Gly Leu Glu Ser Leu Tyr Ala Thr
65                  70                  75                  80

Leu Thr Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
            85                  90                  95

Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Gln Asp Val Ala Lys Glu
            100                 105                 110

Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
            115                 120                 125

Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
    130                 135                 140

Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Val
145                 150                 155                 160

Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
                165                 170                 175

Asn Asn Ile Gln Ala Lys Phe Gly Ile Pro Phe Arg Thr Ala Tyr Ala
            180                 185                 190

Ala Ser Lys His Ala Val Met Gly Phe Phe Asp Cys Leu Arg Ala Glu
    195                 200                 205
```

```
Val Glu Glu Tyr Asp Val Val Val Ser Thr Val Ser Pro Thr Phe Ile
    210             215             220
```

```
Arg Ser Tyr Arg Ala Ser Pro Glu Gln Arg Asn Trp Glu Thr Ser Ile
225             230             235             240
```

```
Cys Lys Phe Phe Cys Arg Lys Leu Ala Tyr Gly Val His Pro Val Glu
            245             250             255
```

```
Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
            260             265             270
```

```
Phe Met Ala Asn Pro Val Pro Lys Ala Ala Val Phe Ile Arg Thr Phe
            275             280             285
```

```
Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys
    290             295             300
```

```
Leu Asn Val Pro Glu Glu Gly
305             310
```


<210> 16
<211> 933
<212> DNA
<213> Mus musculus

<220>
<221> CDS
<222> (1)..(933)

<400> 16
```
atg ggg ctc atg gct gtc ctg atg cta ccc ctg ctg ctg ctg gga atc    48
Met Gly Leu Met Ala Val Leu Met Leu Pro Leu Leu Leu Leu Gly Ile
  1               5                  10                  15
```

```
agc ggc ctc ctc ttc att tac cag gag gca tcc agg ctg tgg tcg aag    96
Ser Gly Leu Leu Phe Ile Tyr Gln Glu Ala Ser Arg Leu Trp Ser Lys
                20                  25                  30
```

```
tct gcc gtg cag aac aaa gtg gtg gtc atc aca gat gcc atc tca gga   144
Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
                35                  40                  45
```

```
ctg gga aag gag tgt gct cgg gtg ttc cat gca ggt ggg gca agg ctg   192
Leu Gly Lys Glu Cys Ala Arg Val Phe His Ala Gly Gly Ala Arg Leu
    50                  55                  60
```

```
gtg ctg tgt gga aag aac tgg gag gga ctg gag agc ctc tat gcc acc   240
Val Leu Cys Gly Lys Asn Trp Glu Gly Leu Glu Ser Leu Tyr Ala Thr
 65                  70                  75                  80
```

```
ttg acc agt gtg gct gac ccc agc aag aca ttc acc ccc aag ctg gtc   288
Leu Thr Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
                85                  90                  95
```

```
ctc ctg gat ctc tca gac att agc tgt gtt caa gat gtg gcc aaa gag   336
Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Gln Asp Val Ala Lys Glu
                100                 105                 110
```

```
gtc ctg gac tgc tac ggc tgt gtg gac atc ctc atc aac aat gcc agc    384
Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
        115             120             125

gtg aaa gtg aag ggg cct gcc cac aag att tcc ctg gag ctt gac aaa    432
Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
    130             135             140

aag atc atg gat gcc aac tac ttc gga ccc atc act tta acc aaa gtt    480
Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Val
145             150             155             160

ctg ctt ccc aac atg atc tcc agg aga aca ggc cag att gtg tta gtg    528
Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
                165             170             175

aac aac atc caa gcg aag ttt gga atc ccg ttc cgc aca gct tat gca    576
Asn Asn Ile Gln Ala Lys Phe Gly Ile Pro Phe Arg Thr Ala Tyr Ala
            180             185             190

gcc tct aag cat gcc gtc atg ggc ttc ttt gac tgc ctc cga gcc gag    624
Ala Ser Lys His Ala Val Met Gly Phe Phe Asp Cys Leu Arg Ala Glu
        195             200             205

gtt gag gaa tac gat gtt gtg gtc agc acc gtg agc cca act ttc atc    672
Val Glu Glu Tyr Asp Val Val Val Ser Thr Val Ser Pro Thr Phe Ile
    210             215             220

cgc tcc tac cgt gct tcc cct gag caa aga aac tgg gag aca tcc att    720
Arg Ser Tyr Arg Ala Ser Pro Glu Gln Arg Asn Trp Glu Thr Ser Ile
225             230             235             240

tgt aaa ttc ttc tgc agg aag cta gcc tat ggc gtg cac ccg gtg gag    768
Cys Lys Phe Phe Cys Arg Lys Leu Ala Tyr Gly Val His Pro Val Glu
                245             250             255

gtg gct gag gaa gtg atg cgc aca gta cgg agg aag aag caa gag gtg    816
Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
            260             265             270

ttc atg gcc aac ccg gtt cct aag gct gcc gtg ttc atc cgc acc ttc    864
Phe Met Ala Asn Pro Val Pro Lys Ala Ala Val Phe Ile Arg Thr Phe
        275             280             285

ttc cct gag ttc ttc ttc gct gtg gtg gcc tgt ggg gtg aag gag aag    912
Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys
    290             295             300

ctc aat gtc cca gaa gag ggt                                        933
Leu Asn Val Pro Glu Glu Gly
305             310
```